I claim:

1. A hierarchical multiplexing method comprising the steps of:
receiving a protocol data unit (PDU) associated with one of a plurality of flows;
sequentially processing the PDU at each of a plurality of hierarchical levels, said processing at each of the plurality of hierarchical levels consisting of:
characterizing the flow at the current hierarchical level; and
gating the PDU wherein the PDU is either passed or dropped based upon the character of the flow at the current level; and
outputting the PDU if the PDU is passed at each of the plurality of hierarchical levels.

2. The hierarchical multiplexing method of claim 1, wherein the plurality of hierarchical levels comprises a last hierarchical level, wherein the step of sequentially processing the PDU at the last hierarchical level comprises the step of queuing the PDU.

3. The hierarchical multiplexing method of claim 2, wherein the step of queuing the PDU comprises the step of buffering the PDU at an egress queue associated with an egress port of a network switching device.

4. The hierarchical multiplexing method of claim 2, wherein the step of queuing the PDU comprises the step of buffering the PDU preceding transmission to a switch fabric.

5. The hierarchical multiplexing method of claim 1, wherein the step of sequentially processing the PDU at one or more hierarchical levels comprises performing one or more forwarding operations.

6. The hierarchical multiplexing method of claim 5, wherein the one or more forwarding operations comprise appending an address to the PDU.

7. The hierarchical multiplexing method of claim 6, wherein the appending of an address to the PDU comprises the steps of:

appending a virtual circuit identifier at a first hierarchical level; and

appending a virtual path identifier at a second hierarchical level.

8. The hierarchical multiplexing method of claim 5, wherein the one or more forwarding operations comprises appending one or more virtual local area network (VLAN) tags at one or more hierarchical levels.

9. The hierarchical multiplexing method of claim 1, wherein:

characterizing comprises the step of measuring a flow rate for the flow associated with the PDU based on a current hierarchical level; and

gating comprises the step of discarding the PDU if it exceeds a maximum bandwidth parameter.

10. The hierarchical multiplexing method of claim 1, wherein the gating comprises the steps of:

associating with the PDU a color marker using a three color marker algorithm; and

applying discard control logic to selectively discard the PDU based upon the color marker.

11. A hierarchical multiplexing method comprising the steps of:

receiving a protocol data unit (PDU) associated with one of a plurality of flows;

sequentially processing the PDU at each of three or more hierarchical levels, said processing at each of the hierarchical levels comprising the step of gating the PDU;

mapping the a plurality of flows between each of the hierarchical levels; and

outputting the PDU if the PDU is passed at each of the plurality of hierarchical levels.

12. A packet processing method comprising the steps of:

receiving a protocol data unit (PDU) associated with one of a plurality of flows;

sequentially processing the PDU at each of a plurality of hierarchical levels, said processing at each of the plurality of hierarchical levels consisting of:

characterizing the flow at the current hierarchical level; and

gating the PDU based upon the character of the flow at the current level; and

outputting the PDU if the PDU is passed at each of the plurality of hierarchical levels.

13. A hierarchical multiplexor comprising:

an input channel for receiving a protocol data unit (PDU) associated with one of a plurality of flows;

a plurality of hierarchical levels, each hierarchical level consisting of:

means for characterizing the flow at the hierarchical level; and

means for gating the PDU based upon the character of the flow at the hierarchical level; and

means for mapping the PDU to a flow at the next hierarchical level; and

an output channel for transmitting the PDU if the PDU is passed at each of the plurality of hierarchical levels.

14. The hierarchical multiplexor of claim 13, wherein one or more of the plurality of hierarchical levels further consists of means for performing forwarding operations associated with the PDU.

15. The hierarchical multiplexor of claim 14, wherein the hierarchical multiplexor further comprises a last hierarchical level comprising:

means for characterizing the flow at the last hierarchical level; and

means for gating the PDU based upon the character of the flow at the last hierarchical level.

16. The hierarchical multiplexor of claim 15, wherein the last hierarchical level further comprises a queue for buffering the PDU at the output channel.

17. The hierarchical multiplexor of claim 14, wherein the means for characterizing the flow comprises a meter for measuring the flow rate of the flow associated with the PDU.

18. The hierarchical multiplexor of claim 17, wherein the means for gating the PDU comprises means for discarding the PDU depending on the flow rate.

19. The hierarchical multiplexor of claim 17, wherein the means for characterizing the flow further comprises a marker module for marking the PDU in accordance with a Three-Color Marker (TCM) algorithm.

20. The hierarchical multiplexor of claim 19, wherein the means for gating the PDU comprises means for discarding the PDU in accordance with the TCM algorithm.

21. A hierarchical multiplexor for processing a protocol data unit (PDU) associated with one of a plurality of flows, the hierarchical multiplexor comprising:

a plurality of hierarchical levels for performing gating operations, each hierarchical level consisting of:

a meter for measuring the flow rate at the hierarchical level; and

a gate for discarding the PDU based upon the flow rate at the hierarchical level; and

a last hierarchical level comprising a queue for buffering the PDU prior to transmission.